

Gov. Doc.
B.C.
P.

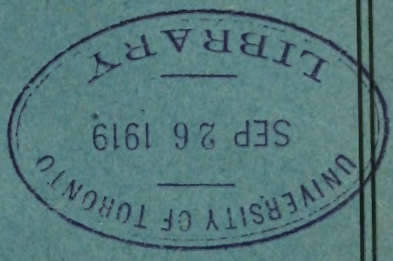
B. C. Provincial Museum, Victoria

STORAGE

PROVINCE OF BRITISH COLUMBIA

QH
71
V6A2
1918
Biological
& Medical
Serials

715
REPORT



OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1918



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:

Printed by WILLIAM H. COLLIN, Printer to the King's Most Excellent Majesty,
1919.



THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA.

....., 191.....

PROVINCIAL MUSEUM OF NATURAL HISTORY
VICTORIA, BRITISH COLUMBIA.

SIR,—I beg to acknowledge the receipt of.....

.....
and would request that further publications of your Museum be sent to
me, addressed as below.

(Address).....

.....

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

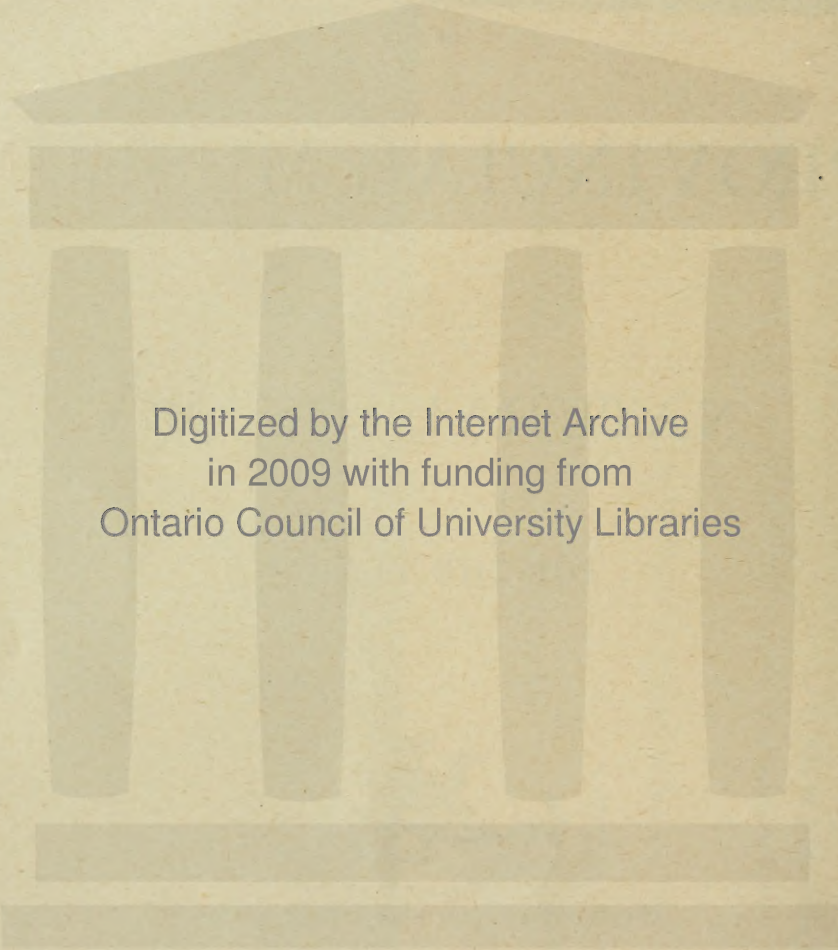
FOR THE YEAR 1918



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:

Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty,
1919.



Digitized by the Internet Archive
in 2009 with funding from
Ontario Council of University Libraries

*To His Honour Sir FRANK STILLMAN BARNARD, K.C.M.G.,
Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits the Annual Report of the Provincial Museum of Natural History for the year 1918.

J. D. MacLEAN,
Provincial Secretary.

*Provincial Secretary's Office,
Victoria, March 7th, 1919.*

PROVINCIAL MUSEUM OF NATURAL HISTORY,

VICTORIA, B.C., March 7th, 1919.

The Honourable J. D. MacLean, M.D.,

Provincial Secretary, Victoria, B.C.

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ending December 31st, 1918, covering the activities of the Museum.

I have the honour to be,

Sir,

Your obedient servant,

FRANCIS KERMODE,

Director.

PROVINCIAL MUSEUM REPORT

FOR THE YEAR 1918.

Since the last Annual Report, although no actual field-work was undertaken, a great deal of time was devoted to the study collection in going through the specimens which have been collected from time to time and are stored in the annex. All the specimens have been rearranged, labelled, and listed, so as to make them more accessible to those who wish to consult them in the several branches of natural sciences.

In this building, which is not in any way fire-proof, is stored a very large and valuable collection of anthropological material, which, if it were to be destroyed by fire, would be impossible to duplicate; this also applies to a large number of totem-poles in the basement under this building. The older people of the aboriginal races of this Province are fast disappearing, and as the younger people do not appear to have any interest in the work done by their forefathers, it will be only a short time at the longest when all the old wood-carvings will be a thing of the past; although without doubt, in many portions of the Province, archæological specimens of the stone age may be unearthed in the vicinity of some of their old camp-sites.

This building also contains the Museum study series of bird-skins, numbering over 4,500 specimens. A number of the leading museums and ornithologists make application for the loan of specimens from time to time for comparison in determining species and subspecies, also for working out the distribution and migration of birds on this continent. The same applies to the mammal study collection, numbering nearly 1,500 specimens.

There is no way of accurately recording the number of visitors who visit the Museum during the year, as a large number of people, including children and Orientals, do not sign their names; however, a glance at the register shows that the average attendance is maintained, as over 30,500 persons having recorded their names in the book which is placed in the entrance-hall for that purpose.

It will be seen from the report on the Botanical section, written by Mr. W. R. Carter, Assistant Biologist, that Professor John Macoun, of Sidney, B.C.; J. M. Macoun, C.M.G., Chief of the Biological Division, Ottawa; Dr. C. F. Newcombe, Victoria; and others have still maintained their friendly interest in the Provincial Herbarium, by presenting specimens to fill in the gaps, principally of the Vancouver Island flora, and as Director I am pleased to say that in the Herbarium to-day there is to be found almost every plant and flowering shrub that is to be found on or recorded from Vancouver Island.

A large number of the specimens that were added this year to the Herbarium had been collected by Mr. W. R. Carter before he was appointed to the staff of the Provincial Museum.

Mr. E. H. Blackmore has continued to carry on the systematic work in the Entomological section; this work is done by Mr. Blackmore gratuitously, and he has written considerable material of interest to entomologists in this report, giving descriptions of new and rare specimens recently described or found in this Province.

A great deal of the time of the Director has been taken up with game matters during the year. I was instructed by the Attorney-General's Department to go over to Vancouver in the latter part of March, and take over the Game Department temporarily before it was handed over to the administration of the Provincial Police. This necessitated the Director being in Vancouver a considerable time each week until the offices were transferred to Victoria. The Director was also made Secretary of the Game Conservation Board by Statute, and has to give considerable of his time to that work, which is under the administration of the Honourable Attorney-General's Department.

The Director hopes that, if funds will permit this year, to carry on more scientific research in the field, so as to fulfil the object of the Provincial Museum.

Very little anthropological material was secured during the year; several small collections were offered to the Department for purchase, but owing to the fact that the appropriation was so limited and the strictest economy was to be exercised, it was thought advisable not to make any of these purchases at present. However, several good specimens of stone pestles (Nos. 3138

and 3139), also stone chisels (Nos. 3140, 3141, and 3142) and spear-points (Nos. 3143 to 3147), were collected many years ago at Port Haney, and presented by Mr. Hector Ferguson, of Vancouver, B.C., to the Provincial Museum. These specimens had been sent to the Provincial Library by mistake some time ago; however, they were finally located and transferred to this Department.

ENTOMOLOGY.

By E. H. BLACKMORE.

Very little field-work has been done during the past season, but some of the material taken by the Museum collectors during the past three years has been further worked over and many interesting facts brought to light. We have kept in touch with several of the collectors in various parts of the Province, and have obtained some new records, together with an added knowledge of the distribution of many of our species, the results of which are embodied in the following pages.

The weather conditions were vastly different to those of the previous seasons; during the last three weeks in April of this year (1918) we had a continuation of bright sunshine with a temperature far above the average, which brought about the emergence of many species far in advance of their normal times of appearance. Amongst the Geometridæ this was especially noticeable, as in many cases they were from four to six weeks earlier than usual; in one case, *Cosymbria lumenaria*, a difference of two months, a specimen being taken in fine condition on April 27th in the Lower Fraser Valley. My earliest previous record of this species is June 15th, 1915, that particular year being rather an early one. It is generally taken from the first to the middle of July.

In August we had a very wet month (I am now referring to Vancouver Island and the Lower Fraser Valley), which is very unusual, as that month is practically the hottest and driest of the whole year. A very noticeable feature of the past summer was the prevalence of high winds for continued periods, a factor which militates greatly against the collection of specimens, especially of diurnals and geometers who will not attempt to fly in the face of a strong wind.

One of the outstanding features of the season in this district was the remarkable scarcity of noctuids, this being the poorest season by far, for many years, from a collecting point of view, although in the Interior conditions did not seem quite so bad.

The damage done by cutworms this year was very light as compared with the two previous seasons; this was rather to be expected, as the season following a particularly heavy outbreak is generally comparatively light, owing to the heavy increase of parasitism amongst the larvæ and pupæ, thus enabling nature to restore her balance.

Unfortunately, to offset this, there was a very heavy infestation of the forest tent-caterpillar (*Malacosoma pluvialis* Dyar); in fact, the heaviest infestation we have had for many years. In normal years they confine themselves to the trees and bushes on vacant lots and on the roadside, but this year they were in such numbers that they attacked everything in sight, invading gardens and orchards and defoliating all kinds of fruit and shade trees. Wherever one went their ugly, unsightly webs were in evidence. A remarkable feature of the late summer was the presence all over the Province in large numbers of *Aglaia californica* Bdv. (the tortoise-shell butterfly). This butterfly occurs regularly in certain sections of the Province, but I do not think that it has ever been so abundant and reported from so many widely separated localities. Mr. W. B. Anderson, Dominion Inspector of Indian Orchards, reported it from Fort George right through to Stuart Lake, all through the Cariboo and Chilcotin Districts down to Lillooet. In a letter under date of August 6th, Mr. A. W. Phair, who is a resident of the latter locality, says in part: "There is a very interesting outbreak here of what I take to be *Vanessa californica*. It is working at about 4,000 feet on a shrub with a heavy laurel-like leaf. The outbreak extends at least fifty miles in a straight line. The shrubs are all eaten off and one little branch would have about a hundred caterpillars on it."

Mr. Phair sent me some twenty pupæ, which emerged the day of their arrival, and it is curious to note that they are all about one-third less in size than the average, and, although I have specimens from all parts of the Province, these are the only dwarf ones I have seen. It may be the altitude, or, what to my mind is more probable, there was such an enormous number of them that they did not get sufficient food to eat, and consequently transformed into pupæ in a somewhat stunted state, which was reflected in the smaller size of the imagines. They also occurred from Cranbrook in the east, through the Keremeos District, down the valley of the

Lower Fraser, and all over Vancouver Island, quite a number appearing in Victoria, even invading the houses. This is the first time I have seen this species in this city during my eight years' residence here.

Another insect which was extremely prevalent throughout the same general localities as the one just mentioned was a noctuid moth (*Autographa californica* Edw.) commonly known as the alfalfa-looper. It is widely distributed in Western North America, but was only known as a pest in Canada since 1914, when a very severe outbreak occurred in this Province. It was so abundant that summer on Vancouver Island that wherever one went a score or more would fly up out of the grass at nearly every step one took. It belongs to one of the few groups of noctuid moths which fly in the daytime, and it is also attracted to certain flowers about sundown.

An important discovery of what may prove to be a serious pest was made by Mr. W. B. Anderson at Chase, B.C., in the early part of August, where one of the tussock-moths (*Hemerocampa vetusta gulosa* Hy. Edw.) was found to be devastating the Douglas fir. Further notes on this moth will be found under the heading of "Illustrated Lepidoptera."

Another interesting and important discovery, especially from an economic aspect, was the finding of the apple-maggot fly at Royal Oak, B.C., by Mr. W. Downes, Field Officer, Entomological Branch, Dominion Department of Agriculture, who is in charge of the Vancouver Island District. It has been identified by Dr. J. M. Aldrich as *Rhagoletis pomonella*. The only previous record of this fly in British Columbia is two specimens taken by Mr. R. C. Treherne at Penticton, B.C., on July 26th, 1916. Mr. Downes has also discovered that the host-plant is the common snowberry (*Symphoricarpos racemosus*) and has bred a number of flies from it. In Eastern Canada it is one of the worst of the fruit pests, but so far no signs of its attacking the apple in British Columbia have been observed.

RARE AND UNCOMMON INSECTS TAKEN IN BRITISH COLUMBIA DURING 1918.

In continuing this section, as was proposed in last year's report, we would like to impress upon the entomologists of this Province, especially those residing in the more outlying districts, the necessity of sending in records of their important captures, accompanied by full data, by December 31st of each year. It is only by this means that we shall get a fuller knowledge of our British Columbia species and their distribution, a knowledge which is most essential both from an economic and a taxonomic standpoint.

Victoria.—Although, as stated previously, the season was a poor one for noctuids generally, the writer has been fortunate in picking up a few species of more than passing interest.

A male specimen of *Apantesis ornata complicata* Wlk. was taken on June 16th. This pretty tiger-moth occurs regularly, but is very uncommon; three specimens in any one year in this district is the most that I have any record of.

On April 12th I took one specimen each of *Xylomyges rubrica* Harv. and *X. perlubens* Grt., at rest on an electric-light pole. These are the first records I have of these two species occurring in Victoria.

In Vancouver *rubrica* occurs regularly with *pulchella*, although much less common. *Perlubens* is plentiful at cherry-blossoms in some districts on the Mainland.

A specimen of *Trachea impulsa* Gue. was taken at light on July 6th, which is also a new record for this district; it has previously been recorded from Kaslo. Another new record for this district is *Autographa metallica* Grt., a specimen of which I took on June 21st; it occurs at Agassiz and in the Kettle Valley District. Other rare noctuids taken were *Polia variolata* Sm. and *Septis plutonia* Grt.

Amongst the Geometridæ it is interesting to note that two specimens of *Diactinia silaccata albolineata* Pack. were taken here for the first time, although I have taken it at points farther up the Island. One specimen was taken on April 30th in fine condition on a store window, and the other at rest on a fence on July 24th, thus indicating that it is double-brooded. Two specimens of *Hydriomena edenata grandis* B. & McD. were taken on electric-light poles on March 16th. They were both females, but could not be induced to lay eggs. This species is rather scarce here, although it is much more plentiful at Duncan, forty miles north of here.

Mr. W. Downes, of Oak Bay, took a nice specimen of *Polia restora* Sm. on August 3rd. This also occurs regular, but not more than one or two seem to be captured in any one year. He also took a specimen of that pretty little noctuid, *Sarothripus revayana columbiana* Hy. Edw., on April 8th. This species seems exceedingly rare. Mr. Downes also took a geometer not previously

recorded from Victoria—viz., *Euphyia luctuata* Schiff—on June 14th; also another specimen of *Eupithecia borealis* Hulst., the first records for British Columbia of this species being mentioned in last year's Museum Report, page 12.

Mr. W. B. Anderson whilst collecting noctuids at light took a nice specimen of the peach-blossom moth (*Euthyatira pudens* Gue.). This is an exceedingly rare moth in this district. He also took a short series of *Hydriomena crokeri* Swett on April 29th. This geometer is as a rule very uncommon and is extremely local. I do not know of any other locality in British Columbia where it has been taken, and even here it seems to be restricted to one section of the city. The same collector took a single specimen of *Erannis vancouverensis* Hulst. on November 30th. This is the first record since I took a solitary specimen here on November 22nd, 1914.

Mr. W. R. Carter, Assistant Biologist of the Provincial Museum, took a fine specimen of that uncommon noctuid, *Rhynchagrotis niger* Sm., on July 15th; also a specimen of *Autographa rectangulata* Kirby, which is a new record for this district. In the Report of the Provincial Museum, 1917, p. 12, mention was made of the taking of a specimen of *Neptyia phantasmaria* Streck, which, together with one other, were the only known records from Victoria. It is interesting to note that Mr. Carter took a specimen on September 16th in Beacon Hill Park; from that time on he visited the park daily, with the result that up to October 3rd he had taken twenty-six specimens (twenty-four males and two females). It has evidently started to breed here, and as it is a pine-feeder there is no doubt but what it will become established here from now on.

My theory is that odd specimens come over on the boats from Vancouver, where it is extremely common in September. They are probably attracted by the bright lights of the ship at night at Vancouver, and settle on some portion of the rigging, flying off the next morning in Victoria, as all specimens found have been in the immediate vicinity of the sea-shore.

Goldstream.—On July 3rd the writer took a trip up Mount MacDonald, one of the mountains to the south of Goldstream, and was fortunate enough to take a couple of male specimens of *Plebeius melissa* Edw., a rather rare butterfly on Vancouver Island. I was pleased to take this, as it had been eliminated from the 1906 Check-list of B.C. Lepidoptera, and I was rather undecided as to its inclusion in a new Check-list which is in preparation.

On another trip on July 5th to Mount Braden, which is west of Goldstream, I took a geometer which at first sight seemed new to me, but later I recognized it as *Stannoctenis morrisata* Hulst., the first specimen of which was taken at Duncan last year (*vide* Report Provincial Museum, 1917, p. 13). I went again on July 8th to the same place and succeeded in taking another one, but an extended search failed to reveal any more specimens. Both of them were males and in fine condition.

Mr. A. W. Hanham, of Duncan, also took two at light and Mr. G. O. Day took one at Maple Bay, so the species looks like it was going to become established.

Other Heterocera of interest taken by the writer at Goldstream were *Autographa mappa* G. & R.; *A. corusea* Streck; *Enyppia packardata* Tayl.; and *Hyperetis trianguliferata* Pack.

Vernon.—Mr. W. Downes took a specimen of *Pieris beckeri* Edw. on September 30th. This butterfly seems very uncommon and is rare in British Columbia collections. He also took a fine specimen on May 24th of *Acronycta mansucta* Em., a rather rare noctuid, and a specimen of *Xanthorhoe ferrugata* on the same date, a geometrid which is not at all common.

Mr. M. Ruhman captured on April 26th one of our rarest arctids—*Phragmatobia fuliginosa borealis* Staud. To my knowledge there have been only three specimens taken in British Columbia—the one just mentioned, one taken by the late Captain R. V. Harvey at Vancouver on April 23rd, 1907, and one taken at Alberni, V.I., by Mr. W. R. Carter in May, 1915.

Kaslo.—Mr. J. W. Cockle has taken a specimen of *Macaria purcellata* Taylor, which is the first that has turned up since the types were taken; he has also taken *M. minorata incolorata* Dyar., which is a very rare geometer and was described from Kaslo in 1904.

NEW BRITISH COLUMBIA INSECTS.

The following twelve insects have been described as new to science during the year 1918. They comprise four species of Lepidoptera, three species of Hymenoptera, and five species of Diptera.

LEPIDOPTERA.

In Cont. Lept. No. Amer., Vol. IV., No. 2, p. 137, May, 1918, Messrs. Barnes and McDunnough describe a new geometrid under the name of *Eustroma fasciata*, from Ketchikan, Alaska, and Cowichan Lake, Vancouver Island, B.C. The types are one male and three females, one of the females being taken in June at Cowichan Lake. This new species is closely allied to *E. nubilata* Pack, which is fairly common throughout the Province, especially the second brood in the early fall. The chief distinguishing features are that in *fasciata* the antemedian white band has much more regular edges and is less bent in at the costa, also that there is no trace of any yellow shading.

Hydriomena macedunnoughi Swett is described in the Can. Ent., Vol. L., No. 9, p. 296, September, 1918, from specimens taken at Atlin, B.C., on June 11th, 1914, by Mr. E. M. Anderson. This new species bears a close superficial resemblance to *H. ruberata* Frey., but differs materially in the male genitalia. In the 1906 Check-list of British Columbia Lepidoptera, *ruberata* was erroneously listed as occurring at Kaslo; we have no authentic records of the occurrence of this species in any part of British Columbia.

MICROLEPIDOPTERA.

In the Can. Ent., Vol. L., No. 7, p. 231 *et seq.*, Annette F. Brown describes several new species of Microlepidoptera, two of which are described from Field, B.C. One of them belongs to the family Yponomeutidae and is named *Swammerdamia cuprescens*. Four species were bred from larvæ feeding from birch; they are gregarious and live in webs, pupating in August and appearing the following May. Larvæ were also taken at Glacier, B.C., feeding on alder, but for some reason or other failed to reach maturity. It is a close ally of the European *S. heroidella*, which is also a birch-feeder. The other one belongs to the family Gracilariidae and is called *Ornix spiræifoliella*. This species is a leaf-miner and feeds on the under-side of the leaves of *Spiræa* sp.; this also pupates in the fall and emerges in the following spring.

HYMENOPTERA.

The Ottawa Naturalist, Vol. XXXII., No. 4, p. 71, October 1918, contains a key to the species of the genus *Vespa*, occurring in Canada, by F. W. L. Sladen. In the course of his paper he describes four new forms, three of which occur in Canada and one in Alaska. The three occurring in Canada also occur in British Columbia and are as follows:—

(1.) *Vespa norvegicoides*, which has a range from Nova Scotia to British Columbia. It is closely related to *diabolica* Saus., which is our commonest wasp, and differs from it, amongst other minor details, by the yellow band on segment, one being narrower and uninterrupted; by the male antennæ being black beneath instead of testaceous; and by the hairs being longer and less dense.

(2.) *Vespa acadica*, recorded from Nova Scotia, New Brunswick, Ontario, and British Columbia; the specific localities for British Columbia being given as Kaslo and Victoria. This species makes an aerial nest and is near to *vidua* Saus., which occurs only in Ontario, as far as Canada is concerned.

(3.) *Vespa atropilosa*, described from one female and many workers. The female was taken at Lethbridge, Alta., while the workers or neuters were all taken in British Columbia, specific localities recorded being Vernon, Okanagan Landing, and Keremeos.

It is interesting to note that, out of eleven species of wasps known to occur in Canada, as many as eight of them are taken in British Columbia; these are enumerated in the following list:—

Vespa maculata Linn. This is the well-known "black hornet," which makes an aerial nest.
V. diabolica Saus. This species is found in Southern British Columbia up to an altitude of 5,000 feet.

V. norvegicoides Sladen.

V. arctica Rohw. (= *borcalis* Lewis). Parasitic in nests of *V. diabolica*.

V. occidentalis Cr.

V. austriaca Pz. This a parasitic species and so far has only been recorded in this Province from Kaslo, in mid-July.

V. acadia Sladen.

V. atropilosa Sladen.

DIPTERA.

In the Annals of the Ent. Socy. of America, Vol. XI., No. 4, December, 1918, Mr. F. W. Pettey gives "A revision of the genus *Sciara* of the family Mycetophilidae. In the course of his revision he describes some thirty new species from North America, two of which are from British Columbia. The first is *Ncosiara lobosa*, described from one male collected at Carbonate, B.C., by a Mr. J. C. Bradley in July, 1908, at an altitude of 2,600 feet. Carbonate is situated about twenty miles south-east of Golden.

The other is *Ncosiara ovata*, described from one male taken at Howser, B.C., by Mr. Bradley on June 22nd, 1905. Howser is situated on the Lardeau River about thirty-five miles north of Kaslo. It would be as well to state here that *Ncosiara* is a new genus erected by Mr. Pettey, to include those species which have no setæ on the cubitus and media, and which would formerly have been placed under the old genus *Sciara*, which have setæ on these veins.

Two species of the genus *Drapetis*, belonging to the family Empididae, are described by A. L. Melander in the Annals of Ent. Socy. Amer., Vol. XI., No. 2, June, 1918. The first is *Drapetis alternigra*, which is very widely distributed, it being found in New York, Massachusetts, Pennsylvania, South Dakota, Texas, and British Columbia. The second is *Drapetis infumata*, described from two specimens, the type specimen being taken at Nelson, B.C., on July 17th, 1910, and the paratype at Priest Lake, Idaho, on August 1st, 1915.

Sarcophaga vancouverensis Parker is described in the Can. Ent., Vol. L., No. 4, p. 122, April, 1918. This new species was described from eight specimens (seven males and one female) taken by Mr. R. S. Sherman on Savary Island, B.C., and at Vancouver, B.C., on various dates from May 12th to July 3rd, 1916.

We extend our congratulations to Mr. Sherman on his discovery of a new species, as he has done so much to advance our knowledge of the dipterous fauna of this Province.

We would like to mention an article written by Dr. A. E. Cameron (who was Dominion Field Officer in charge of the pear-thrips investigation at Royal Oak, B.C., for two years) and published in the Annals of the Ent. Socy. Amer., Vol. XI., No. 1, March, 1918. The article is entitled the "Life-history of the Leaf-eating Crane-fly, *Cylindrotoma splendens* Doane." It gives a complete account of its habits and its life-history from the egg to the imago.

It is illustrated with some very fine drawings by the author, representing the larvæ and its most important parts, the pupa and the imago. The larvæ of this crane-fly was discovered at Westholme, on Vancouver Island, some forty miles north of Victoria. The value of the discovery lies in the fact that this represents the first finding of the immature stages of any species of this genus on the American Continent.

ILLUSTRATED LEPIDOPTERA.

We have thought that it may be of more interest and benefit to the entomologists in various parts of the Province to describe more fully the insects illustrated in the plates contained in the Annual Reports of the Provincial Museum, and a beginning is made with those moths figured on the two plates accompanying this article. The species in the following annotated list are given in their proper scientific order, the numbers appearing before each name corresponding with a similar number in Messrs. Barnes and McDunnough's Check-list of No. Amer. Lepidoptera, February, 1917. Those with a star prefixed to them have been described since that list was published.

NOCTUIDÆ (PLATE I.).

1315. *Euxoa quinquelinea* Sm. This is a moth that has not hitherto been recorded from British Columbia. Recently, upon working over a collection of noctuids made by Mr. W. H. Danby at Rossland, B.C., some twenty years ago, I found several species that were entirely new to me. These were subsequently submitted to Dr. J. McDunnough, of Decatur, Ill., for identification, some of them proving new to British Columbia. This species is one of them; it is evidently a mountain species, as its habitat is the Sierra Nevadas of California.

E. lutulenta, which was also described by Dr. J. B. Smith at the same time (*vide* Trans. Am. Ent. Socy., XVII., p. 50, 1900), is now placed as a geographical race of *quinquelinea*. We also have a specimen of this form taken at Vernon, B.C., in 1916.

1682. *Polia negussa* Sm. This was also taken by Mr. Danby at Rossland, B.C., in 1898, and is also new to British Columbia. It was described by Smith in the Can. Ent., XXXII., August,

PLATE I.
NOCTUIDÆ AND LYMANTRIIDÆ.

Gortyna pallereens Sm.
Alberni, B.C. (W. R. Carter).
(Very rare.)

Arzama obliqua Walk.
Duncan, B.C. (E. M. Skinner).
(New to British Columbia.)

Andropolia ardon Grt.
Duncan, B.C. (E. M. Skinner).
(New to British Columbia.)

Euxoa quinquelinea Sm.
Rossland, B.C. (W. H. Danby).
(New to British Columbia.)

Ipimorpha nanaimo Barnes.
Victoria, B.C. (E. H. Blackmore).
(Very rare.)

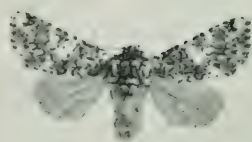
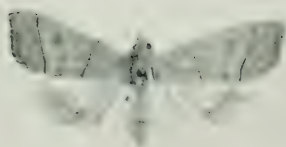
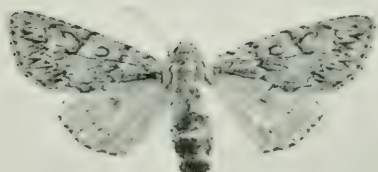
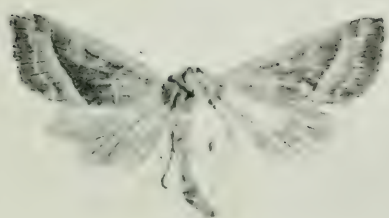
Polia variolata Sm.
Victoria, B.C. (E. H. Blackmore).
(Very rare.)

Folia negussa Sm.
Rossland, B.C. (W. H. Danby).
(New to British Columbia.)

Autographa V-alba Ottol.
Rossland, B.C. (W. H. Danby).
(New to British Columbia.)

Hemicrocampa vetusta gulosa Hy. Edw.
Chase, B.C. (W. B. Anderson).
(New to British Columbia.)

Bomolocha torcuta Grt.
Duncan, B.C. (G. O. Day).
(Very rare.)



1900, from two males and two females taken by F. H. Wooley Dod at Calgary, Alta. It is very closely allied to *segregata* Sm. and *gussata* Sm., Dr. McDunnough being of the opinion that they are probably forms of one species.

P. segregata was described from Laggan, Alta., and is recorded from Kaslo, B.C. I have a specimen of it from Sicamous, B.C. It is also a mountain form and evidently very uncommon. These two species are very much alike in maculation, *negussa* being more reddish-brown in colour and lacking the black markings of *segregata*.

1702. *Polia variolata* Sm. This specimen was described from Washington Territory by Smith in 1887, Proc. U.S. Nat. Mus., X., p. 467, from one male and one female. We have a specimen in the Museum collection labelled "Victoria, B.C.," and presumably taken about 1902. There is no other record of its occurrence in British Columbia that I know of until the capture of the specimen figured in the plate, on July, 1918. It must be exceedingly rare when a period of sixteen years elapses without its capture being recorded, especially in a district which is continually and regularly worked over.

2646. *Gortyna pallescens* Sm. The specimen figured was taken by Mr. W. R. Carter at Alberni, B.C., in August, 1915; one was also taken by Mr. Downes at Armstrong, B.C., on August 28th. It was also recorded in the 1906 Check-list of B.C. Lepidoptera, under the name of *medialis* Sm., as occurring at Kaslo.

In Bulletin 52, U.S. Nat. Mus., Dr. Dyar places *pallescens* as a synonym of *medialis* Sm., but in Barnes and McDunnough's new Check-list they are treated as separate, although closely allied species. In the British Columbia Check-list the name *medialis* should be eliminated, and *pallescens* substituted for it. It is interesting to note that this uncommon insect has been taken in two districts whose climatic conditions are the exact opposite of each other. Alberni being an extremely wet district, while Armstrong is in the hot dry belt.

2524. *Andropolia ardon* Grt. One specimen without date taken by the late E. M. Skinner at Quamichan Lake, near Duncan, presumably in 1896. This has not hitherto been recorded from British Columbia. Its habitat is Colorado, Nevada, and Washington. One of the types is in the British Museum.

2725. *Ipimorpha nanaimo* Barnes. This delicate ochre-coloured moth is very uncommon in this district. There is a specimen in the Museum collection taken in Victoria on August 2nd, 1898. I have no other record from here until the one I took at rest on a fence on August 18th, 1918, just twenty years later. The one in the Museum collection was determined many years ago by Dr. Smith as *pleneetusa* Grt., which, although agreeing in maculation, is decidedly smaller and darker in coloration, being of a very dark fawn colour on both primaries and secondaries. The latter occurs throughout the Atlantic States, Colorado, and Utah. Mr. A. W. Hanham, of Duncan, B.C., took this latter species in Victoria many years ago, and I was fortunate enough to take one specimen in perfect condition at light on August 25th, 1916.

2784. *Arzama obliqua* Wlk. This species is new to British Columbia and was taken by the late E. M. Skinner at Quamichan Lake on June 26th, 1906. This is a very interesting record, as it is rather surprising to find it on the Pacific Coast; it is distributed over a wide area on the American Continent, from Eastern Canada south to Florida, and thence west to the Mississippi. It is a reed-feeder, the larva feeding from the top downwards until the whole of the reed is eaten out, then returning to the top and forming its pupa there. *Bellura gortymoides* Wlk. is very closely allied, and is reported from Wellington and Vancouver, although I have not as yet seen the species.

3245. *Autographa V-alba* Ottol. Taken by Mr. W. H. Danby at Rossland about the year 1900, but without specific date. This is also new to British Columbia, and was described from Wyoming by Dr. Ottolengui in Jn. N.Y. Ent. Socy., X., p. 73, 1902. It is a very pretty species and bears a strong superficial resemblance to *speciosa*, from which it can readily be distinguished by the shape of the "Y" mark.

3571. *Bomolocha torcuta* Grt. This species was referred to in the Provincial Museum Report, p. 12, 1917. In the 1906 B.C. Check-list it is reported from Cameron Lake, and one specimen was taken by Mr. R. C. Treherne at Agassiz on August 1st. This latter record would indicate that it is double-brooded, or at least partially so, as Mr. Day's specimens emerged in May from larvae taken the previous August. The ground colour is a rich smoky brown, the white blotch in the inner margin being very striking. It occurs from New York to Texas.

LYMANTRIDÆ (PLATE I.).

3704 (b.) *Heemrocampa vetusta gulosa* Hy. Edw. This moth, which has hitherto not been recorded from British Columbia, is very interesting from both a systematic and economic standpoint. It was discovered by Mr. W. B. Anderson, who is Dominion Inspector of Indian Orchards, on one of his periodical trips in the Interior. It was taken at Chase, B.C., where it was doing much damage to the Douglas fir. Imagines and full-fed larvæ were taken together on August 6th, showing it to be double-brooded. The females are wingless and live solely for the purpose of oviposition; having laid her eggs she covers them with hairy scales, which she plucks from her body and mixes them with a gummy secretion, which on drying becomes hard and brittle; as her mission in life is then ended, she dies.

The full-fed larvæ noted above spun up about August 12th, emerging in the breeding-cage on September 1st and 2nd. There are three closely allied forms—*vetusta* Bdv., described from the Coast region of California in 1852; *gulosa* Hy. Edw., described from the same general locality in 1881; and *cana* Hy. Edw., described from the Sierra Nevadas of California in the same year. After a careful comparison with the descriptions published by Neumoegen and Dyar in their "Preliminary Revision of the Bombyces of America," Jn. N.Y. Ent. Socy., Vol. II., p. 29, March, 1894, I have not the slightest hesitation in referring this British Columbia form to *gulosa*, which together with *cana* are made races of *vetusta* in Barnes and McDunnough's new Check-list. It is also a near relative of *H. leucostigma* A. & S. (the white-marked tussock-moth), whose ravages upon shade-trees and shrubbery in the Atlantic States are well known.

GEOMETRIDÆ (PLATE II.).

4002 (a.) *Dysstroma formosa boreata* Tayl. This is rather an interesting record, as its capture is of very rare occurrence. It was taken near Victoria by Mr. W. Downes on July 23rd, 1917. It was described in the Can. Ent., Vol. XLII., p. 87, March, 1910., from two specimens taken by Mr. T. Bryant near the Stikine River, in Northern British Columbia, on July 24th and 25th, 1905. In Barnes and McDunnough's new Check-list it is placed as a race of *formosa* Hulst., and in my opinion rightly so, as the maculation is practically the same, with the exception of the extra basal bar, which is quite distinct and perfectly black instead of red or orange.

Typical *formosa*, which was described from Colorado, also occurs in British Columbia, the writer having in his cabinet a rather poor specimen taken at Lillooet on June 23rd, 1916, and there is a specimen in the Swett collection taken by the late Mr. Livingstone at Cowichan Bay, B.C.

* *Hydriomena macdunnoughi* Swett. This specimen, new to science, is noted fully under the heading of "New British Columbian Insects."

* *Hydriomena perfracta casperata* B. & McD. In last year's Museum Report mention was made of the new forms of *Hydriomena*, described by Messrs. Barnes and McDunnough in their revision of that group, Cont. Lept. No. Amer., Vol. IV., No. 1, May, 1917. The specimen figured is one of them and was taken by the writer near Victoria on May 19th, 1914, whilst beating for Geometridæ. It was described from two specimens, both males, one taken at Departure Bay and the other at Wellington, both localities being on Vancouver Island; it is a geographical race of *perfracta* Swett, which is taken in the Catskill Mountains, N.Y. The latter was originally described as a variety of *carulata* Fabr. (*autumnalis* Strom), but is now considered as distinct, on account of difference in the shape of the uncus in the two forms.

4360 (a.) *Phasianæ respersata teucaria* Stkr. This little geometrid was listed in the 1906 B.C. Check-list as *Macaria teucaria* with a question-mark; later it was determined as *respersata* Hulst., but finally it has been identified as *teucaria*, which was described from Seattle, Wash., and is really only a large form of *respersata*, whose nimitypical locality is Colorado. *Teucaria* occurs on Mount Tzouhalem, near Duncan, and although I have collected assiduously in the vicinity of Victoria for the past eight seasons, I had only taken two specimens until last May (1918), when I took thirty-seven at Mount Tolmie on May 28th. In a long series they are rather variable as regards the intensity of the markings, and also in the presence or absence of the intradiscal line; in some forms this line is present from the costa to the median vein only, giving the insect quite a different appearance. (For earlier notes on this species see Proc. Ent. Socy., B.C., No. 6, p. 110, June, 1915.)

4372 (b.) *Phasianæ nepturia sinuata* Pack. Both *nepturia* Gu. and *sinuata* have been listed in previous B.C. Check-lists as occurring here, the latter being retained in the list on account

PLATE II.
GEOMETRIDÆ.

Lycia ursaria Walk.
Rossland, B.C. (W. H. Danby).
(New to British Columbia.)

Gabriola dyari Taylor.
Victoria, B.C. (E. H. Blackmore).
(Very uncommon.)

Euchlora albertanensis Swett.
Armstrong, B.C. (W. Downes).
(New to British Columbia.)

Dysstroma formosa borcata Taylor.
Victoria, B.C. (W. Downes).
(Very rare.)

Gonodontis formosa Hulst.
Lillooet, B.C. (A. W. Phair).
(New to British Columbia.)

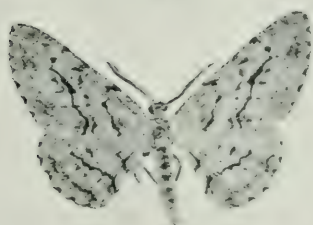
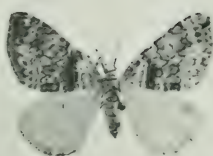
Phasiene respersata teucaria Streck.
Victoria, B.C. (E. H. Blackmore).

Cicora albescens Hulst.
Duncan, B.C. (G. O. Day).
(Very rare.)

Phasiene neptaria sinuata Pack.
Goldstream, B.C. (E. H. Blackmore).

Hydriomena perfracta crasperata B. & McD.
Victoria, B.C. (E. H. Blackmore).
(New to British Columbia.)

Hydriomena macdunnoughi Swett.
(Paratype male.)
Atlin, B.C. (E. M. Anderson).
(New to science.)



of its being described from one male specimen taken at Victoria by a Mr. G. R. Crotch, who collected in this district, about the year 1873. Apparently this species had disappeared, and all the specimens taken in recent years have been named *neptaria*, which was described from California.

The solution to this apparent disappearance lies in the fact that the two species are practically alike in maculation, the only difference being the larger size of *sinuata*; therefore the latter is now considered to be a northern race of *neptaria*.

Sinuata occurs right across the southern portion of British Columbia from Vancouver Island to the Rocky Mountains. The specimen figured is typical. *Neptaria* must now be eliminated from our Check-list.

4554. *Cleora albescens* Hulst. One of our very rare geometers. It was described from Seattle, Wash., by Hulst in Trans. Am. Ent. Socy., XXIII., p. 355, September, 1896. There are very few records of its capture in British Columbia. The late Rev. G. W. Taylor took it many years ago at Wellington; the late A. H. Bush took one specimen at Vancouver on May 22nd, 1902; and Mr. G. O. Day took two or three at Maple Bay, near Duncan, in August, 1911; and although it has been diligently searched for, none have been taken since. These are the only authentic records that I know of. This and *excelsaria* Strks., which was figured in Annual Report of the Provincial Museum, 1917, Plate II., were previously placed in the genus *Scridosoma*; but this genus, together with the genus *Aleis*, has been discarded, and all the species belonging to these two genera have been transferred to the genus *Cleora*.

4608. *Lycia ursaria* Walk. This is an Atlantic States species and is entirely new to our fauna; it was taken by W. H. Danby at Rossland some eighteen years ago. It was described from Albany, N.Y., in 1860, and the type specimen is in the D'Urban collection of North America Lepidoptera, which is now the property of the Entomological Society of Ontario, and is in the collection of the Agricultural College at Guelph.

4612. *Gabriola dyari* Tayl. Described from four male specimens taken in August, 1903, on Gabriola Island, opposite Nanaimo. In his description (Can. Ent., Vol. XXXVI., p. 256, September, 1904) Taylor says that it seems to be not uncommon on Vancouver Island and that he has not seen a female. It may be more common in the Nanaimo District, but it is not so in the vicinity of Victoria.

I have taken four specimens (three males and one female) in six years of collecting exclusively for geometrids. The female has the same markings as the male, but is larger, the male measuring in alar expanse 24 mm., while the female expands to 28 mm., the antennæ of the female is filiform, while the male antennæ are heavily pectinated.

4691. *Gonodontis formosa* Hulst. Taken at Lillooet on October 4th, 1917, by Mr. A. W. Phair. This species is new to British Columbia, and its capture so far north is rather unexpected, as its habitat in Colorado and Southern California. The specimen figured is a little worn; when in a fresh condition it is evidently a rather handsome insect.

* *Euchlana albertanensis* Swett. On looking over a collection of Lepidoptera made by Mr. W. Downes at Armstrong, B.C., a few years ago, I came across four specimens of a species of *Euchlana* that were decidedly different to any that I had seen before. Knowing that the species going under the name of *pectinaria* Pack. in our British Columbia collection was wrongly named, I listed them provisionally as *pectinaria*, especially as they agreed fairly well with Packard's description in Mon. Geom. U.S. Geol. Survey, Vol. X., 1876. Recently in sending some material to Dr. McDunnough for identification I included one of these Armstrong specimens, and he informs me that it is *albertanensis* Swett. This new species was described in Can. Ent., Vol. 49, p. 351, October, 1917, the male type coming from Calgary, Alta., and the female type from Edmonton, Alta.

Mr. Downes's specimens comprise three males and one female, and were captured on April 25th and 30th, 1914; they are the only specimens I have seen, although I have worked over considerable material taken at Vernon and Okanagan Landing during the last three years.

Mr. Downes informs me, however, that the insect fauna of Armstrong in some respects differs very materially from that of Vernon, although the two localities are only twelve miles apart. There is more bush at Armstrong and the climate is more humid. It may be as well to state here that the moth going under the name of *pectinaria* in local collections is in reality *E. tigrinaria sircnaria* Streck.

BOTANY.

As no field-work of any description was undertaken during the season of 1918, there is little to chronicle in the Botanical section of the Provincial Museum during this period; however, the collection in the Provincial Herbarium has been materially increased and a number of specimens not hitherto in the collection have been added from the following sources:—

Additions to the collection of Professor John Macoun, received from Mr. J. M. Macoun, Chief of the Division of Biology, Geological Survey, Ottawa:—

MARSILEACEÆ.

Marsilea vestita Hook.

SALVINIACEÆ.

Azolla caroliniana Willd.

LYCOPODIACEÆ.

Lycopodium annotinum L., var. *alpestre*.

Lycopodium selago var. *miyoshianum* Makino.

Lycopodium selago L.

Lycopodium sitchense Rupr.

NAJADACEÆ.

Phyllospadix scouleri Hook.

Potamogeton zosterifolius Schum.

Phyllospadix torreyi Wats.

Ruppia maritima L.

Potamogeton pusillus L.

Zostera marina L.

Potamogeton perlongus Wulf.

JUNCAGINACEÆ.

Triglochin maritima L.

ARACEÆ.

Lysichiton kamschatcense Schott.

ORCHIDACEÆ.

Habenaria gracilis Wats.

SAXIFRAGACEÆ.

Ribes bracteosum Dougl.

Saxifraga mertensiana Bong.

Saxifraga bongardi Presl.

Saxifraga rufidula Small.

Saxifraga emarginata Small.

Saxifraga vespertina Small.

Saxifraga integrifolia Hook.

CALLITRICHACEÆ.

Callitriche bolanderi Heg.

GENTIANACEÆ.

Gentiana sceptrum Griseb.

SCROPHULARIACEÆ.

Orthocarpus cernanthus Benth.

COMPOSITEÆ.

Arnica gracilis Rydb.

Crocidium multicaule Hook.

Artemisia saksdorffii Piper.

Tanacetum huronense Nutt.

Cotula coronopifolia L.

A collection of Musci from Professor John Macoun, Sidney, V.I., B.C.:—

SPHAGNACEÆ.

Sphagnum capillaceum Andrews, var. *tenellum*.

Sphagnum fuscum Von Klinggraeff.

Sphagnum capillaceum Andrews, var. *rubellum*.

DICRANACEÆ.

Onchophorus virens Brid.

WEISIEÆ.

Dicranoweisia cirrhata Lindb.

Dicranoweisia crispula Lindb.

CERATODONTEÆ.

Ceratodon purpureus Brid.

Distichium capillaceum Bruch & Schimp.

POTTIÆ.

Didymodon rubellus Bruch & Schimp.

GRIMMIÆ.

Grimmia apocarpa Hedw.

Racomitrium hypnoides.

Grimmia calyptrata Hook.

ORTHOTRICHÆ.

Orthotrichum rupestre Schleich.

BARTRAMIEÆ.

Philonotis fontana Brid.

Bartramia halleriana Hedw.

PHYSCOMITRIÆ.

Funaria hygrometrica Sibth.

BRYEÆ.

Bryum duvalii Voit.

Mnium punctatum Hedw.

Leptobryum pyriforme Schimp.

AULACOMNIEÆ.

Aulacomnium palustre Schwaegr.

POLYTRICHEÆ.

Polytrichum juniperinum Willd.

Polytrichum strictum Banks.

HYPNACEÆ.

Amblystegium riparium Bruch & Schimp.

Hypnum curvifolium Hedw.

Amblystegium serpens Bruch & Schimp.

Hypnum fluitans Linn.

Calliergon schreberi Willd.

Hypnum hamulosum Bruch & Schimp.

Camptothecium nitens Schimp.

Hypnum lycopodiodes Schwaegr.

Hypnum cristicastris Linn.

Hypnum uncinatum Hedw.

A small collection of grasses and plants collected in British Columbia by Mr. J. M. Macoun.

A short series from Lytton collected by Mr. W. B. Anderson. A collection of Vancouver Islands plants, approximately 650 specimens, from W. R. Carter, Assistant Biologist. This collection was made prior to Mr. Carter being appointed to the staff of the Provincial Museum, and it represents chiefly the flora of the Alberni District and illustrates the luxuriant growth of the Humid Transition area; this collection includes original specimens of a number of plants not previously recorded from Vancouver Island, together with two which are new to Canada.

These collections have been mounted by Miss H. J. Hendry, Recorder in the office of the Museum, and placed in the Herbarium of the Provincial Museum.

The following list taken from these collections are additions not previously in the collection:—

Polypodium scolieri Hook. & Grev.

Melica subulata (Griseb.) Scrib.

Adiantum pedatum L., var. *aleuticum* Rupr.

Oryzopsis hymenoides R. & S.

Sparganium minimum Fries.

Panicum occidentale Scrib.

Lilæa subulata H. & P.

Carex ænea Fernald.

Agropyron biflorum (Brign.) R. & S.

Carex deweyana var. *bolanderi* Boot.

Agropyron inerme (S. & S.) Rydb.

Carex exsiccata Bailey.

Agropyron tenerum Vasey.

Carex feta Bailey.

Agrostis hyemalis (Walt.) B.S.P.

Carex flava L.

Briza media L.

Carex lasiocarpa Ehrh.

Calamagrostis langsfordii (Link.) Trin.

Carex leersii Willd.

Danthonia californica Bol.

Carex phaeocephala Piper.

Danthonia intermedia Vasey.

Carex preslii Steud.

Echinochloa crusgalli (L.) Nash.

Carex pyrenaica Wahl.

Festuca idahoensis Elmer.

Carex sitchensis Bong.

Glyceria nervata Trin.

Eleocharis obtusa (Willd.) Schultes.

Hierochloa odorata (L.) Wahlenb.

Juncus mertensianus Bong.

Koeleria cristata (L.) Pers.

Juncus oreganus Wats.

Melica bella Piper.

Juncus subtriflorus Coville.

Melica hartfordii Bol.

Luzula pipieri (Cov.).

Allium cernuum Roth., form *alba*.
Allium crenulatum Wiegand.
Asparagus officinalis L.
Disporum smithii (Hook.) Piper.
Erythronium grandiflorum Pursh.
Sisyrinchium segetum Bicknell.
Salix hookeriana Barr, var. *laurifolia*.
Salix mackenziana Barr.
Betula papyrifera Marsh.
Alnus oregana Nutt.
Alnus sitchensis (Regel.) Sarg.
Corylus rostrata Ait.
Eriogonum subalpinum Greene.
Polygonum douglasii Greene.
Polygonum nuttallii Small.
Arenaria verna L.
Montia chamissoi (Led.) Dur. & Jack.
Coptis asplenifolia Salisb.
Platystigma oreganum (Nutt.) Benth. & Hook.
Corydalis scouleri Hook.
Subularia aquatica L.
Athyasus pusillus Greene.
Thysanocarpus curvipes Hook.
Drosera anglica Huds.
Leptarrhena amplexifolia (Sternb.) Ser.
Mitella caulescens Nutt.
Parnassia fimbriata Banks.
Saxifraga delicatula Rydb.
Saxifraga emarginata Small.
Saxifraga saximontana E. Nels.
Ribes laxiflorum Pursh.
Aruncus sylvester Kost.
Sanguisorba microcephala Presl.
Spiraea menziesii Presl., form *alba*.

Lathyrus palustris L.
Trifolium arvense L.
Vicia cracca L.
Lythrum salicaria L.
Ludvigia palustris Ell.
Myriophyllum verticillatum L.
Sanicula septentrionalis Greene.
Hypopytes.
Hypopytes.
Newberrya congesta Torr.
Vaccinium sp. deliciosum Piper.
Dodecatheon puberulum (Nutt.) Piper.
Apocynum cannabinum L.
Gilia capitata Dougl.
Myosotis ? scorpioides L.
Prunella vulgaris L., form *alba*.
Prunella vulgaris var. *lanceolata* form *erubescens* Fernald.
Scutellaria lateriflora L.
Solanum nigrum L.
Chelone nemorosa Dougl.
Gratiola virginiana L.
Gratiola ebracteata Benth.
Orthocarpus castilleoides Benth.
Pedicularis ornithoryncha Benth.
Boschniakia strobiliacea Gray.
Plantago major var. *minimum* Dene.
Galium trifidum L., var. *subbiflorum* Wieg.
Valerianella macrocera T. & G., a form.
Lobelia dortmanna L.
Madia glomerata Hook.
Petasites frigida (L.) Fries.
Senecio fastigiatus macounii (Greene.) Greenman.

A number of named and identified specimens of plants collected in Alaska and the islands of the Behring Sea have also been donated by Mr. J. M. Macoun, of Ottawa; these plants are a most valuable acquisition for reference and comparison with any collection made in the northern areas of this Province.

While the collection in the Herbarium is steadily growing, it is as yet far from representative of the flora of British Columbia; there are still several large areas of the Province not represented, and much new material may be looked for in the northern and north-eastern fields, and especially on portions of the mountain ranges on the west coast of Vancouver Island, where a number of plants known to occur on the Olympic Mountains, in Washington, and unknown to us, may appear.

The increase of introduced plants around our cities and railways is largely in evidence; many of these, being noxious weeds, can hardly be looked upon as a beneficial exchange for our native flora which is fast disappearing from these settled areas.

